2004 MOURNING DOVE POPULATION AND RESEARCH STATUS REPORT

John H. Schulz
Resource Scientist

2003 MOURNING DOVE HARVESTS

Final harvest data for 2003 show 43,531 mourning dove hunters harvested 806,349 doves statewide; a 13.0% increase in hunters and a 17.7% increase in harvest from 2002. The estimated 2003 dove harvest increased 11.9% from the 5-year average (1998-02) (720,639 average harvest; SD 33,495) and increased 3.7% from the 10-year average (1993-02) (777,526 average harvest; SD 85,785). Statewide, dove hunters averaged 4.4 doves per day and 4.3 days of hunting per season in 2003 compared to 4.0 doves per day and 4.4 days per season in 2002. Average season bag for 2003 was 18.5 mourning doves compared to 17.8 in 2002. Regional data for 2003 showed Northeastern Riverbreaks and Northern and Eastern Ozark Border with the highest harvests (202,410 and 120,141 doves respectively) and Northern Riverbreaks the lowest (32,177 doves; Fig. 1).

Although the dove harvest and number of hunters showed substantial increases last year, long-term trends of harvest and hunters continue to show declines (Fig. 2), with daily bag and average days afield remaining relatively stable or slightly increasing (Fig. 3). Although the number of hunters and harvested doves has declined since the 1970s, remaining dove hunters are hunting about the same number days, while gradually increasing their daily harvest.

SEASON FORMAT CONTINUES

Missouri will continue a 70-day season and 12-bird bag limit this fall. Following is background information explaining how we arrived at this format.

Prior to 1990, Missouri opted for a 70-day season and 10-bird bag limit. The reason for the voluntary bag limit reduction from 12 to 10 doves was to express concern to the U.S. Fish and Wildlife Service (USFWS) and other states in the Central Management Unit (CMU; Fig. 4) over long-term population trend declines. In 1990, however, we took advantage of the actual allotted 12-bird bag limit that corresponded with the 70-day season provided by the federal frameworks. With this increase in bag limit, we could still hunt doves the first 10-days of November. In 1992, however, Missouri chose the 15-bird bag limit which required a 60-day season format. This decision eliminated late season mourning dove hunting opportunities for approximately 75,000 to 80,000 quail and pheasant hunters in early November. After the 1992 regulation change the Department received numerous comments and suggestions concerning lost dove hunting

opportunities during the first 10-days of November. Based on those concerns, a split season was established during 1999 and 2000 to provide dove hunting opportunity over a longer time period.

Prior to the split season format, field staff reported that they knew of few, if any, hunters that hunted doves during October. After the 1999 split dove season, however, the Department received several calls and letters from hunters that had become accustomed to dove hunting in October. Data were gathered from various sources to learn more about impacts of the split season. Results showed that the vast majority of dove hunters (76%) and conservation agents (66%) wanted to return to a continuous season format. Although a majority of hunters (53%) and conservation agents (51%) wanted to retain the 15-bird limit and 60-day season, data from managed dove shooting areas showed that most hunters seldom shoot their full bag limit (Fig. 5). Thus, a return to the slightly lower bag limit and slightly longer season was considered the best compromise.

EURASIAN COLLARED-DOVES AND WHITE-WINGED DOVES IN AGGREGATE

For the third year, Missouri dove hunters will be allowed to shoot 12 mourning doves (*Zenaida macroura*), Eurasian collared-doves (*Streptopelia decaocto*), and/or white-winged doves (*Zenaida asiatica*) in aggregate. The primary reason for this change was to provide for the incidental take of these birds during the regular mourning dove hunting season. An early season migratory bird hunting pamphlet has been developed which will assist dove hunters with the identification of these species.

Eurasian collared-doves are a relatively new and exotic species that is spreading across the U.S. from east to west. The bird is native to northern Africa and rapidly colonized Europe during the 1940s and 1950s. The bird was first observed in southern Florida in the mid-1980s, most likely brought ashore during a tropical storm. Currently, the birds appear to have statewide distribution in Missouri. Eurasian collared-doves have a characteristic black ring at the base of the neck or nape, have a broad squared-off tail compared to the narrow and pointed tail of a mourning dove, and are much larger than mourning doves.

In addition, white-winged doves have been expanding their range northward from southern Texas, into Oklahoma, Kansas, Nebraska, and Missouri. White-winged doves are easily distinguished in the field by large white wing patches that are visible either in-flight or on the roost.

MOURNING DOVE POPULATIONS TRENDS/SURVEYS

The Department annually conducts two dove surveys in Missouri, the Mourning Dove Call-Count Survey (CCS) and the Roadside Dove Survey (RDS). The CCS is a national survey conducted annually in cooperation with the states and the USFWS. The CCS was established in 1966, and currently contains ≥1,000 survey routes nationally. The CCS was established to provide regional and national population indices. In Missouri, the CCS index is the average number of doves heard calling per mile along 20 standard routes. The RDS is an independent survey conducted annually by Department staff; the survey contains usable data going back to 1948. The RDS provides an index of doves seen, rather than calling, along standardized routes

throughout the state (some counties excluded). The RDS provides regional data for Missouri that the CCS cannot supply. There is very strong long-term relationship between both surveys over several decades; however, the two surveys may show opposite trends within a given year.

For Missouri, CCS route regression analysis between 2003 and 2004 showed a nonsignificant ($P > 0.1$) decrease of 9.8% (90% CI _31.1% to 11.4%; Fig. 6). During the last 10-years (1995-04), Missouri's CCS dove trend data showed a significant ($P < 0.01$) decrease of 6.0% (90% CI _8.0% to _4.1%) per year. Long-term trends from Missouri's CCS data continued to show a significant ($P < 0.01$) decline of 2.1% (90% CI _3.4% to _0.9%) per year from 1966-2004. Throughout the 14 Central Management Unit (CMU; Fig. 4) states, 2004 dove populations showed a significant ($P < 0.01$) decrease of 13.2% (90% CI _18.7% to _7.7%) compared to 2003 population indices.

Statewide results of the 2003 RDS showed 1.44 doves/mile; a 6.7% increase compared to 2003 (Fig. 6), a 9.9% increase from the statewide 5-year average (1999-03; 1.31 doves/mile, SD 0.13), and a 12.5% increase from the statewide 10-year average (1994-03; 1.28 doves/mile, SD 0.15; Table 1). Regionally (Fig. 1), Mississippi Lowlands had the highest index (3.22 doves/mile) and the Ozark Plateau the lowest (0.64 doves/mile; Table 1).

This year the CCS data show a slight decrease, and RDS data show slight trend increases (Fig. 6), indicating stable to slightly higher population levels compared to previous years. Depending upon weather conditions the last week of August and early September, and food availability to concentrate doves, hunting opportunities are anticipated to be good.

LONG-TERM POPULATION TRENDS

Long-term mourning dove trends from both RDS and CCS surveys provide an interesting picture (Fig. 6). Since 1966, both surveys show a strong relationship ($r = 0.76$; 1966-2002); a stronger relationship exists for the RDS and the North American Breeding Bird Survey (BBS) index of mourning doves ($r = 0.89$; 1966-1996). If we assume that these 2 (or 3) surveys are tracking similar aspects of the mourning dove population, we see 3 things from Figure 6. First, we see that although trends have declined since 1966, the trend has been relatively stable in the last 10 years. Second, we see that although trends are lower today than during the late 1960s, RDS trends are near levels similar to the late 1940s and early 1950s. Third, we see that some phenomena occurred during the late 1950s and early 1960s that caused trends to climb rapidly. Regionally, we can speculate that some beneficial and broad scale land use changes occurred in the Mississippi Lowlands, Northeast Riverbreaks, Northeastern Riverbreaks, and Western Prairie during the late 1950s and early 1960s (Fig. 7-14).

From a national perspective, some controversy exists about the relative merits of the BBS and CCS surveys, and the ability of the surveys to track changes in mourning dove population trends. Although the CCS protocol is specifically designed for doves, the number of survey routes is less compared to the BBS, which leads to concerns about the sensitivity of the survey to detect trends. In addition, these trend declines may not be indicative of actual changes in populations, but rather an index to unmated males in the breeding season, changes in habitat along

standardized survey routes, or other factors. Although uncertain in some respects, these data provide a useful and generalized picture of relative population trends for use in providing hunting forecast, etc. These uncertain data, however, show the need for improving the reliability of the information used the harvest management decision making process (i.e., establishing and changing hunting regulations).

MONITORING DOVE SHOOTING FIELD MANAGEMENT

Mourning doves can provide abundant hunting opportunities close to where urban residents live. Unlike other game animals that require relatively large areas of habitat for hunting, dove shooting field management can routinely occur on sunflower fields ranging in size from 5 to 30 acres. However, considerable uncertainty exists concerning mourning dove harvest management strategies; e.g., half day vs. all day hunting, large daily harvests in relatively short periods vs. small daily harvests spread out over a longer interval.

To address this set of management questions, biologists from several conservation areas with active dove shooting management programs met in July, 2000 to develop a long-term Adaptive Resource Management (ARM) process; the program was expanded to include additional areas in 2003. The ARM process works best with management problems such as this one because the problem is small enough to explicitly define and develop a meaningful monitoring program. Thus, the overall goal of the ARM program is learn how different dove management strategies impact our objective of maximizing dove hunting opportunities on public areas. To monitor our success in meeting our objective, we are measuring the number of hunters, hours hunted, doves killed, and shots fired on select conservation areas along with regulation type and number/quality of managed fields (Table 2). As a part of the monitoring program, dove hunters on these areas will be required to report the number of doves killed, shots fired, and hours hunted. Data obtained from 11 conservation areas during 2003 show that many dove hunters likely enjoy the opportunity to see and shoot numerous doves regardless of their ability to actually harvest and take home some birds (Table 3).

MOURNING DOVE RESEARCH UPDATE

National Pilot Banding Study

To improve future harvest management decisions at the national, regional, and statewide levels, population information is needed to make better informed decisions. New population models are being constructed using existing historical data to help make more informed harvest management strategies and to illustrate which pieces of new population information are most critical. Efforts are also underway to initiate a banding program in 28 states (Fig. 15) to obtain band reporting rates and harvest rates for use in the population models, which in turn will be used making decisions about future changes in hunting regulations. To date, these efforts have received wide spread support (e.g., flyway technical committees, flyway councils, joint flyway councils, IAFWA subcommittees and working groups). Missouri has selected 11 banding stations, and trapping will be completed before the season opener.

Hunters that shoot and retrieve banded birds are asked to cal **1-800-327-BAND (2263)**. Hunters

will be asked by the operator to provide the band number, the location where the bird was killed, and the date when the bird was killed. By reporting band numbers dove hunters will be helping to manage our dove resource for future generations.

Long-term Localized Banding Study

Given the increasing popularity of dove hunting near urban areas, local dove harvests and associated intensity of managing sunflower fields have increased substantially on numerous conservation areas. Managers and biologists, however, have limited knowledge of how these locally intensive harvests effect populations. For example, what subpopulations or subgroups of mourning doves are harvested on these areas; locally established populations or different migratory subpopulations passing through the area? What are some plausible explanations for observed annual fluctuations in year-to-year harvests on these managed areas?

Using a collaborative effort between research and management staff to address these issues, a long-term banding study (>10-years) was initiated in 2000 at the James A. Reed Memorial Wildlife Area. Trapping annually occurs during the summer (July 1 – August 21) and winter (January 1 – February 28); 1,000 doves are the target sample size for each trapping session. It will be several years before any meaningful conclusions can be made.

Trichomoniasis Study Update

Trichomonas gallinae is a pear-shaped flagellated protozoan which sometimes causes a fatal disease called trichomoniasis in mourning doves, other columbids (i.e., pigeon-like birds), and some raptors. The disease is thought to be transmitted when infected adult doves feed nestlings, and/or contaminate drinking water and food sources (i.e., bird feeders or baths) used by other doves. Weather conditions may contribute to disease transmission; e.g., extended hot dry weather may force birds to use limited but contaminated food and water supplies. Trichomonads are usually found in the oral-nasal cavity, or anterior end of the digestive and respiratory tracts of infected birds. Symptoms include difficulty flying, listlessness, swollen necks, and cheesy yellowish lesions in the oral cavity. The infected individual dies when the lesions block the trachea and oral cavity making eating and respiration impossible.

Building reliable information about the impacts of trichomoniasis on mourning doves (*Zenaida macroura*) may become an important element in our understanding of mourning dove population dynamics. Therefore, our objectives were to monitor the presence and annual variation of *Trichomonas gallinae* for six years in a local mourning dove population using hunter-killed doves each year, explore possible reasons for observed changes in annual presence of the disease, and evaluate the practicality of a large-scale volunteer reporting program to monitor *T. gallinae* trends in mourning dove populations. During 1998–2003, we sampled 4,052 hunter-killed doves for the presence of *T. gallinae* and found 226 (5.6%) that tested positive (4.4% – 10.6% range). During the 6-year study we also received 161 credible reports of trichomoniasis from volunteers, of which 60 (37.3%) were confirmed by observation of the diagnostic lesion; credible reports were related to observations at recreational bird feeders in urban/suburban locations. Results of our hunter-killed sampling effort were relatively consistent during the 6-year period, with the presence of *T. gallinae* below most previously reported estimates for

mourning doves. Our results also indicate that asymptomatic carries in one segment of the population may provide a mechanism for spreading the disease to naive segments of the population. Determining the occurrence of seasonal epizootics based upon the combined results of our volunteer monitoring program and monitoring of hunter-killed doves proved problematic for several reasons because neither method provided a reliable tool for determining disease's population status on a local or broad scale.

Funding and assistance for this study was provided by 1998 Webless Migratory Game Bird Research Program (U.S. Fish and Wildlife Service and the U.S. Geological Survey-Biological Resources Division), Missouri Department of Conservation-Conservation Research Center (Federal Aid in Wildlife Restoration Project W-13-R-52), and BioMed Diagnostics (San Jose, CA).

Pb shot Evaluation and Proposed Research

Mourning dove hunting is becoming increasingly popular, especially hunting over managed shooting fields. Given the possible increase in lead (Pb) shot availability on these conservation areas, our objectives were to estimate availability and ingestion of spent shot at the Eagle Bluffs Conservation Area (EBCA; hunted with non-toxic shot) and the James A. Reed Memorial Wildlife Area (JARWA; hunted with Pb shot) in Missouri. During 1998, we collected soil samples one or 2 weeks prior to the hunting season (prehunt) and after 4 days of dove hunting (posthunt). We also collected information on number of doves harvested, number of shots fired, shotgun gauge, and shotshell size used.

Dove carcasses were collected on both areas during 1998-99. At EBCA, 60 hunters deposited an estimated 64,775 pellets/ha of non-toxic shot on or around the managed field. At JARWA, approximately 1,086,275 pellets/ha of Pb shot were deposited by 728 hunters. Our posthunt estimates of spent shot availability from soil sampling were 0 pellets/ha for EBCA and 6,342 pellets/ha for JARWA. Our findings suggest that existing soil sampling protocols may not provide accurate estimates of spent shot availability in managed dove shooting fields. During 1998-99, 15 of 310 (4.8%) mourning doves collected from EBCA had ingested non-toxic shot. For doves that ingested shot, 6 (40.0%) contained $\geq$7 shot pellets. In comparison, only 2 of 574 (0.3%) doves collected from JARWA had ingested Pb shot.

Because a greater proportion of doves ingested multiple steel pellets compared to Pb pellets, we suggest that doves feeding in fields hunted with Pb shot may succumb to acute Pb toxicosis and thus become unavailable to harvest, resulting in an underestimate of ingestion rates. Although further research is needed to test this hypothesis, our findings may partially explain why previous studies have shown few doves with ingested Pb shot despite feeding on areas with high Pb shot availability. Follow-up research projects have been initiated that will provide more reliable information for possible changes in dove hunting regulations. The projects include investigations exploring effects of acute and chronic Pb toxicosis, shot selection by doves according to shot type (e.g., Pb and steel). Full details of the earlier investigation are available in the **Wildlife Society Bulletin 2002, 30(1): 112-120**.

Third Transmitter Implant Study Completed

Although it has been ≥40 years since the development of wildlife radio telemetry, there continues to be uncertainty about the effects of transmitters on individually marked birds, and its effects on the resulting information. It is critical to understand how radio transmitters and their attachment techniques impact marked individuals and the resulting information. Each transmitter attachment technique is a compromise between minimizing potential negative effects of carrying the transmitter, and maximizing transmitter retention. Many studies assess only overt, deleterious effects when studying transmitter effects. However, subtle physiological effects caused by attachment techniques might compromise the integrity of resulting information. Our objectives, therefore, were to assess the efficacy of subcutaneous implants, and determine the physiological effects on Mourning Doves (*Zenaida macroura*) using heterophil:lymphocyte (H:L) ratios, blood plasma chemistries, and fecal glucocorticoid measures. We conducted two trials with 60 Mourning Doves; one in summer/fall (trial #1) and one in fall/winter (trial #2). For each trial, we assigned 15 male and 15 female doves to either a subcutaneous implant treatment, or a control group. During the two trials, we observed no differences in body weights, H:L ratios, fecal corticosterone levels, or blood plasma chemistries between Mourning Doves with subcutaneous implants and the control group. The entire surgical procedure required 8–14 min to implant subcutaneous radio transmitters, which is similar to external transmitter attachment procedures. Given the ultimate use of the information obtained from telemetry projects and the cost of the resulting initiatives, expenditures associated with rigorous experimental evaluations can only improve the basis of reliable knowledge used in making management decisions.

Funding for this study was provided by 2001 Webless Migratory Game Bird Research Program (U.S. Fish and Wildlife Service and the U.S. Geological Survey-Biological Resources Division), Missouri Department of Conservation-Conservation Research Center (Federal Aid in Wildlife Restoration Project W-13-R-56), University of Missouri (Department of Fisheries and Wildlife Sciences; Veterinary Medical Teaching Hospital; Veterinary Diagnostic Laboratory), and Advanced Telemetry Systems (Isanti, Minnesota).

Table 1. Percent change of the 2004 Roadside Mourning Dove Survey relative to 2003, 5-year (1999 – 03), and 10-year (1994 – 03) averages.

Zoogeographic Regions	2004 Index[a]	2-Year (2003 – 04) % Change	5-Year (1999 – 03) % Change	10-Year (1994 – 03) % Change
Northwest Prairie (11)[b]	1.80	1.1	6.8	12.4
Northern Riverbreaks (11)	1.54	9.6	11.2	21.5
Northeast Riverbreaks (18)	1.52	13.3	20.3	21.2
Western Prairie (11)	1.60	-12.4	-5.8	-13.9
Western Ozark Border (13)	1.67	19.3	13.8	10.9
Ozark Plateau (22)	0.64	11.4	13.4	17.6
Northern and Eastern Ozark Border (10)	0.84	-8.7	-20.3	-21.0
Mississippi Lowlands (7)	3.22	7.5	19.7	39.6
STATEWIDE (103)	1.44	6.7	9.9	12.5

[a]Survey index is equal to the number of mourning doves observed per mile.
[b]Number of counties within zoogeographic region with a completed and returned survey route.

Table 2. Dove harvest characteristics during September 2003 from conservation areas cooperating with an Adaptive Resource Management (ARM) program to evaluate the effects of different hunter management strategies on the goal of maximizing hunting opportunities.

Area	Doves Killed	Shots Fired	Hours Hunted	Sum of All Hunters
A. A. Busch CA	984	4935	1778	1019
Bois D'Arc CA	2280	14744	3106	1018
Columbia Bottom CA	10666	43468	3417	1264
Eagle Bluffs CA	778	3748	430	200
Otter Slough CA	315	1436	421	181
Pony Express CA	5379	31900	2840	879
Platte Falls CA	1486	7578	916	382
J. A. Reed Mem. WA	6219	30303	2586	1323
Shawnee Trail CA	744	4007	689	332
Talbot CA	476	2849	724	317
Ten Mile Pond CA	2231	9075	876	356
TOTAL	**31558**	**154043**	**17783**	**7271**

Table 3. The distribution of the mourning dove bag by the number hunters on 11 conservation areas during September 2003 (see Figure 5 for an average distribution of all areas combined).

DAILY BAG	ABCA	BDCA	CBCA	EBCA	OSCA	PECA	PFCA	RMWA	STCA	TACA	TMCA	TOTAL	%[1]
0	352	416	105	32	80	154	114	305	108	132	44	1842	28.4
1	118	152	54	30	28	65	35	126	34	41	35	718	11.1
2	62	105	51	17	18	76	27	92	28	23	22	521	8.0
3	36	66	46	20	7	44	20	93	12	9	23	376	5.8
4	23	48	52	17	7	43	14	65	11	14	20	314	4.8
5	16	21	42	15	6	48	16	46	7	4	16	237	3.6
6	13	33	41	8	3	40	13	47	11	9	17	235	3.6
7	8	12	40	6	2	36	8	28	5	1	12	158	2.4
8	4	18	36	6	4	36	12	28	3	0	20	167	2.6
9	6	7	45	4	2	22	12	37	4	4	17	160	2.5
10	4	13	49	10	2	40	10	24	3	6	13	174	2.7
11	2	10	41	3	2	36	5	31	1	3	14	148	2.3
12	8	52	647	17	4	237	59	291	27	8	95	1445	22.2
TOTAL	652	953	1249	185	165	877	345	1213	254	254	348	6495	100

[1]Proportion of all areas combined.

ABCA = A. A. Busch (

BDCA = Bois D'Arc C

CBCA = Columbia Bo

EBCA = Eagle Bluffs (

OSCA = Otter Slough (

PECA = Pony Express

PFCA = Platte Falls C/

RMWA = J. A. Reed M

STCA = Shawnee Trai

TACA = Talbot CA

TMCA = Ten Mile Por

Figure 1. Zoogeographic regions of Missouri.

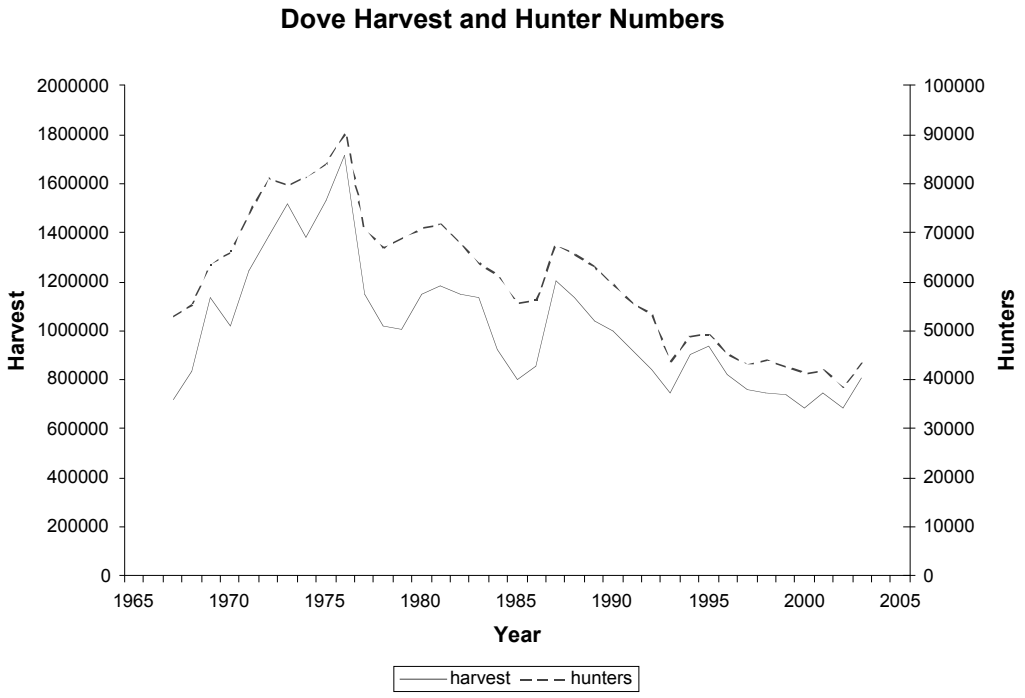

Figure 2. Long-term trends (1967 – 03) of mourning dove harvest and number of dove hunters in Missouri.

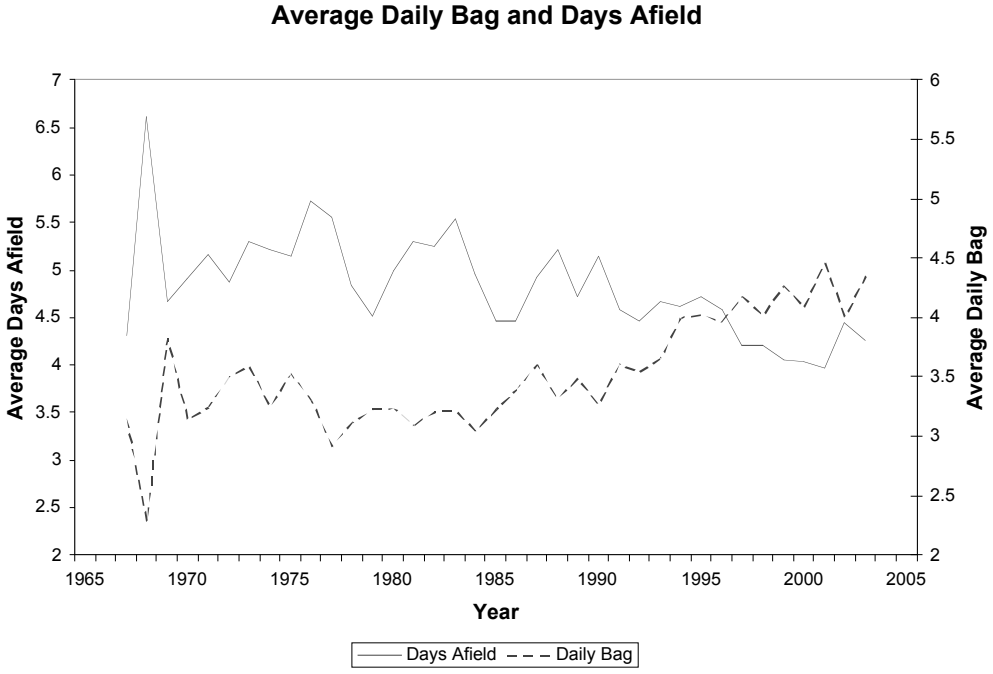

Figure 3. Long-term trends (1967– 03) of mourning dove average daily bag limit and average number of days afield for Missouri dove hunters.

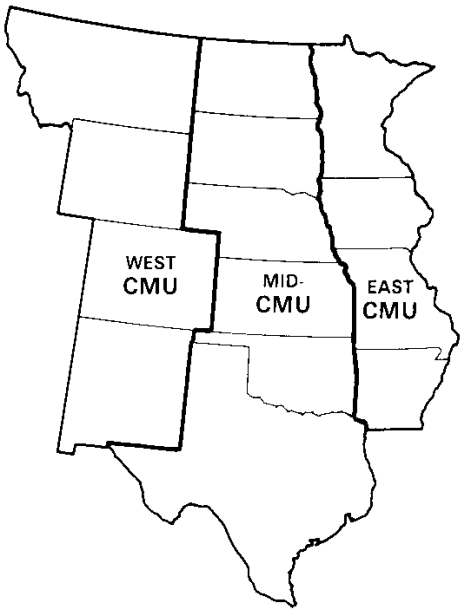

Figure 4. Central Management Unit (CMU) states and subunits used in managing mourning dove harvest.

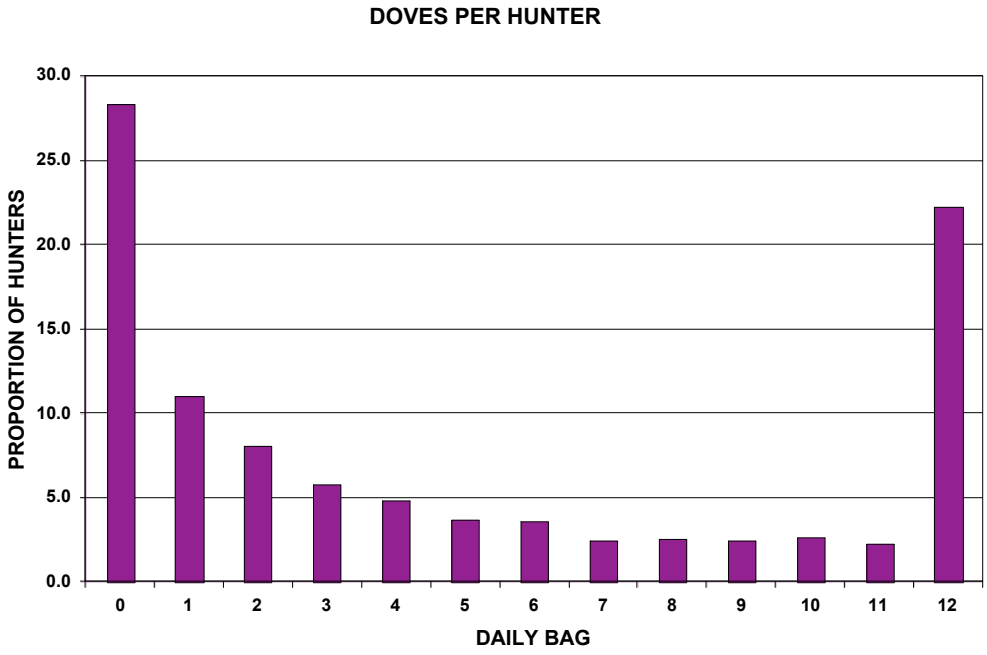

Figure 5. The proportion of mourning dove bag by number of almost 6,500 dove hunters during September 2003 on 11 conservation areas providing managed shooting fields (see Table 3 for specific proportions for each area).

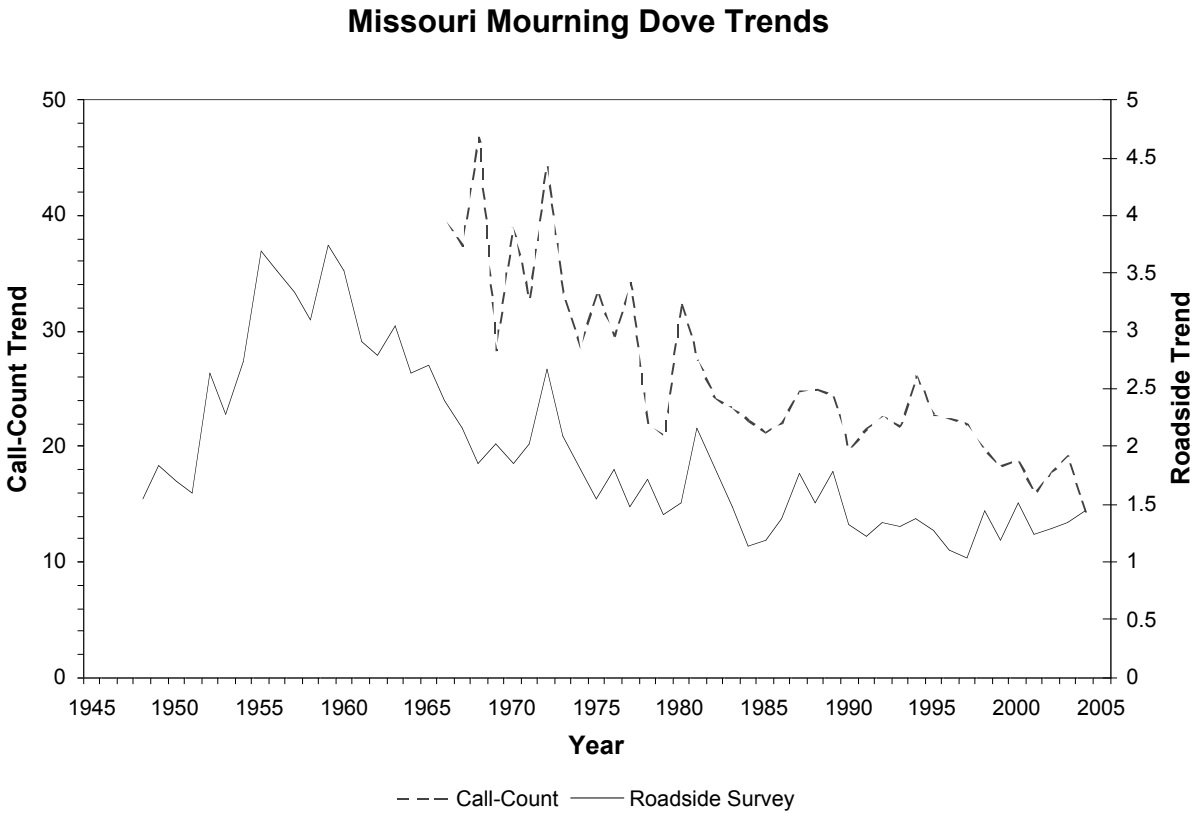

Figure 6. Missouri roadside mourning dove survey (RDS) expressed as doves/mile (1948 - 2004) and U.S. Fish and Wildlife Service mourning dove call-count survey (CCS) route regression trend analysis (1966-2004).

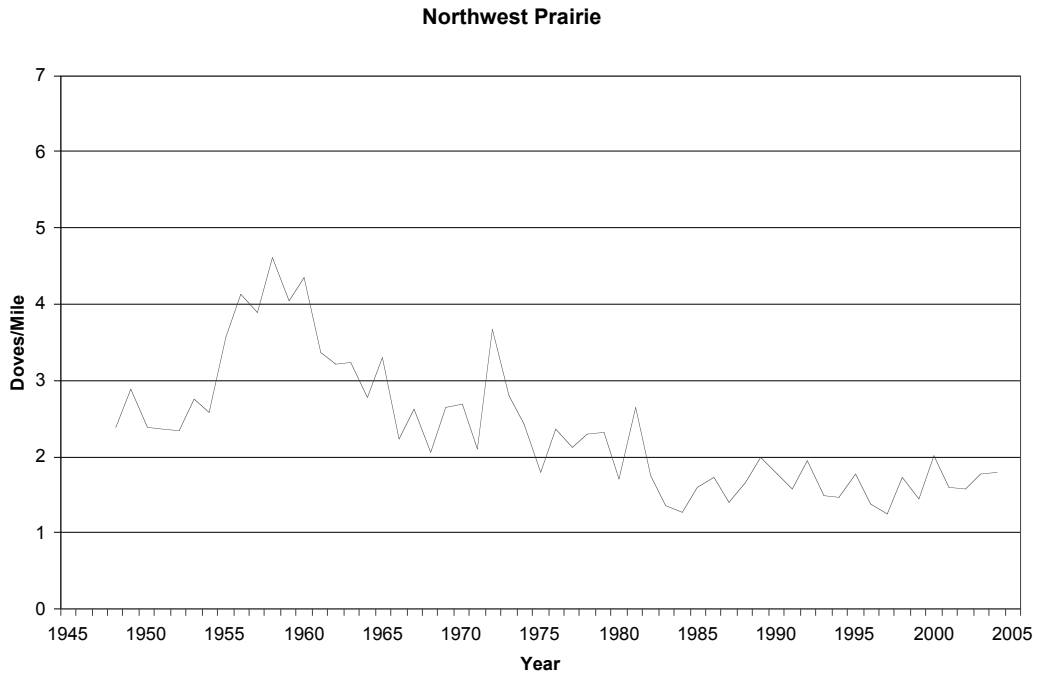

Figure 7. Northwest Prairie long-term trends.

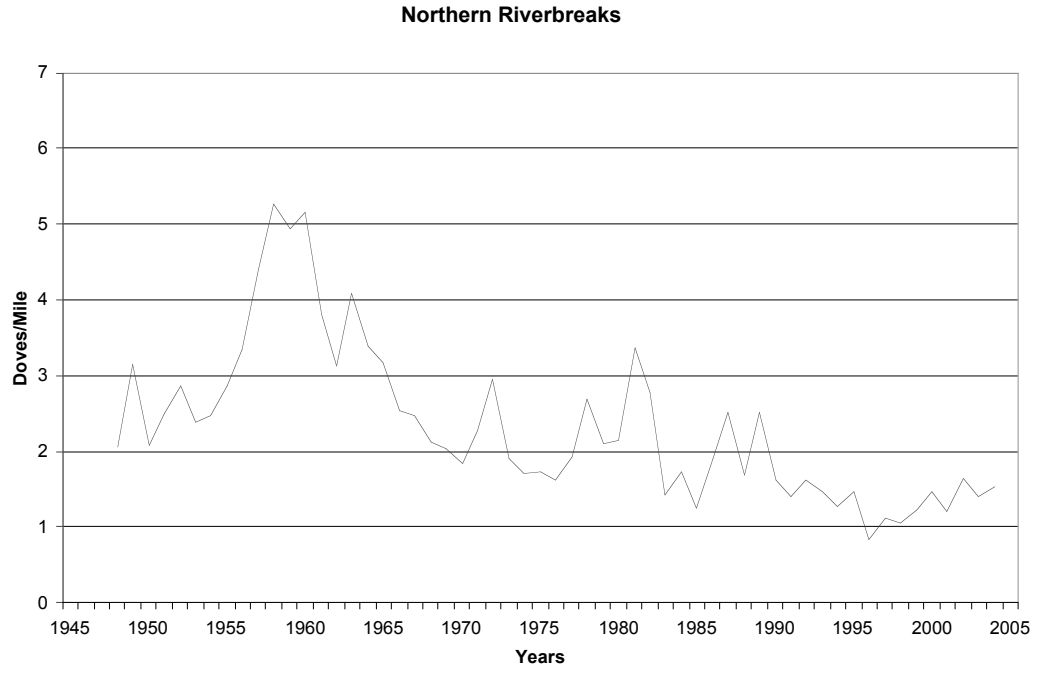

Figure 8. Northern Riverbreaks long-term trends.

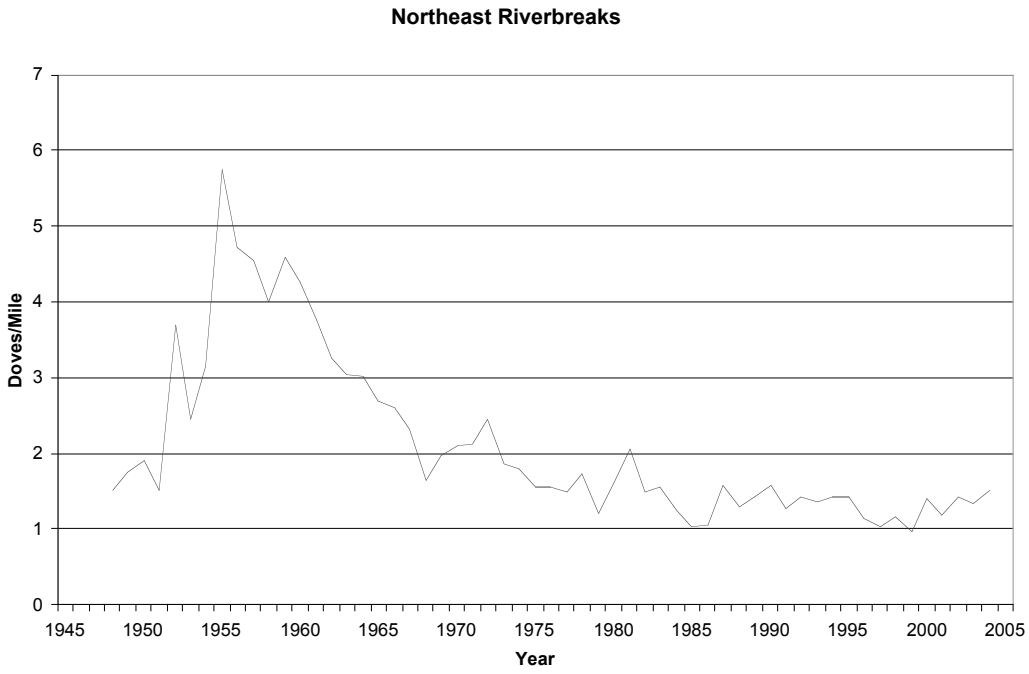

Figure 9. Northeast Riverbreaks long-term trends.

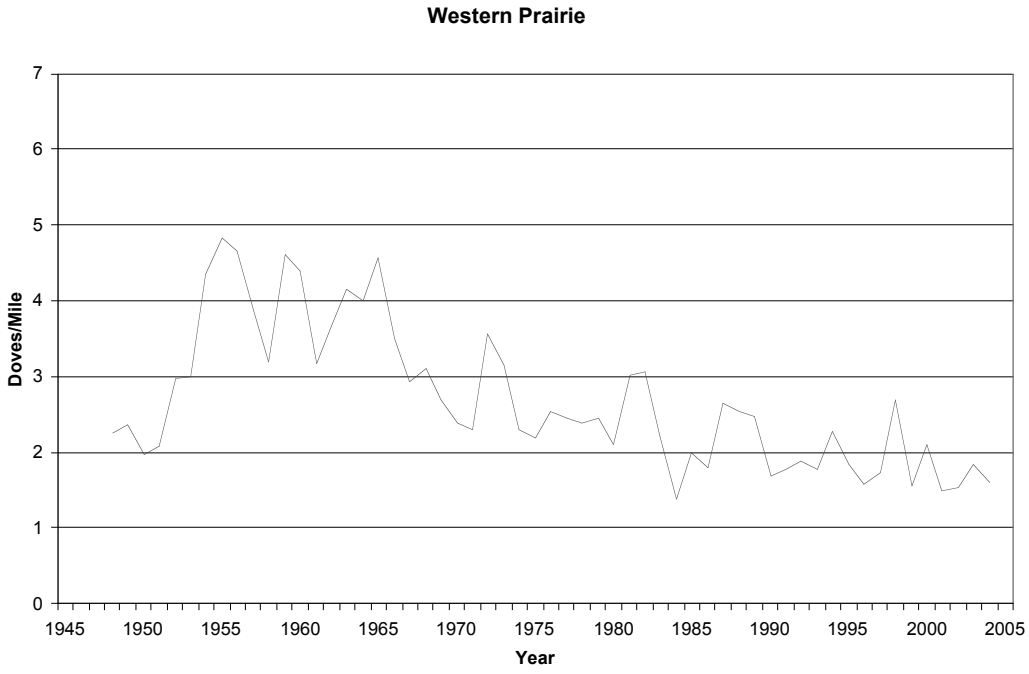

Figure 10. Western Prairie long-term trends.

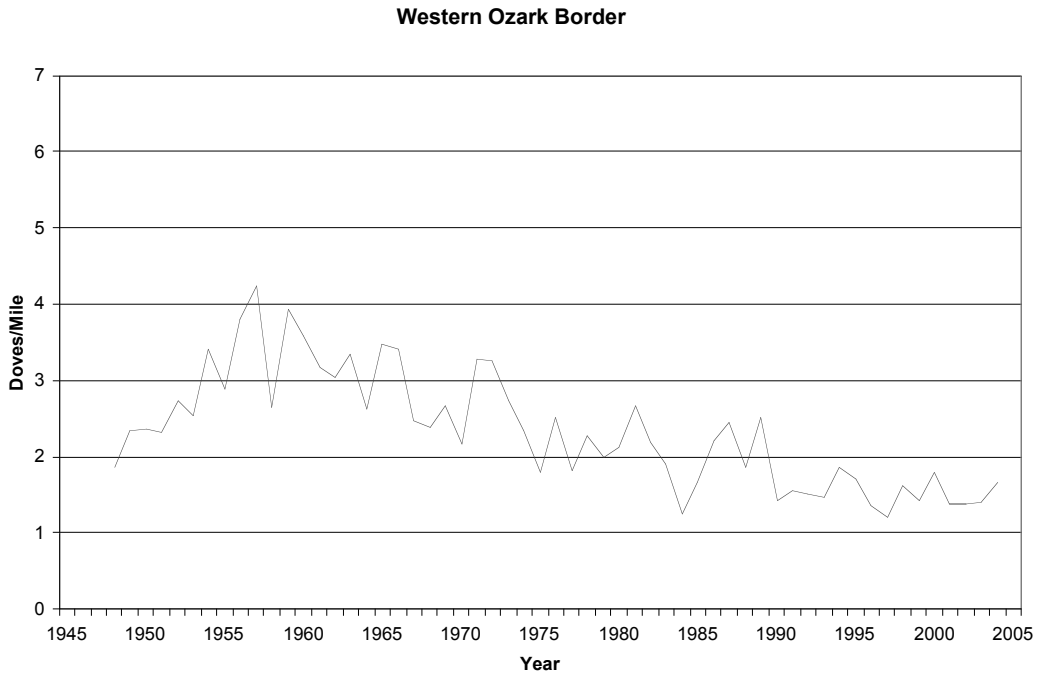

Figure 11. Western Ozark Border long-term trends.

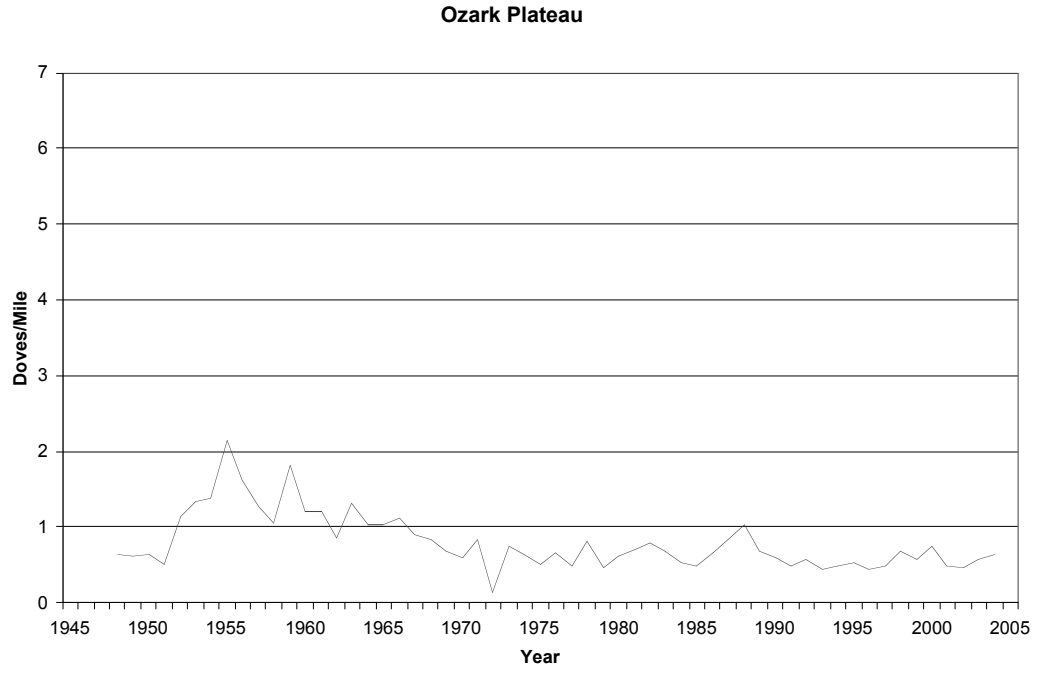

Figure 12. Ozark Plateau long-term trends.

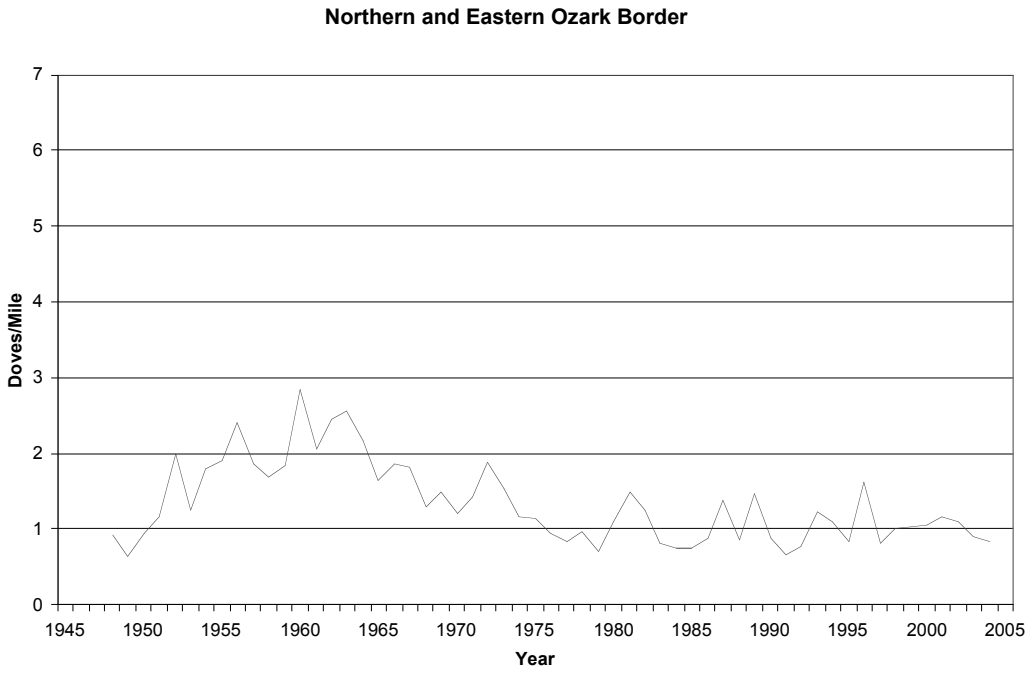

Figure 13. Northern and Eastern Ozark Border long-term trends.

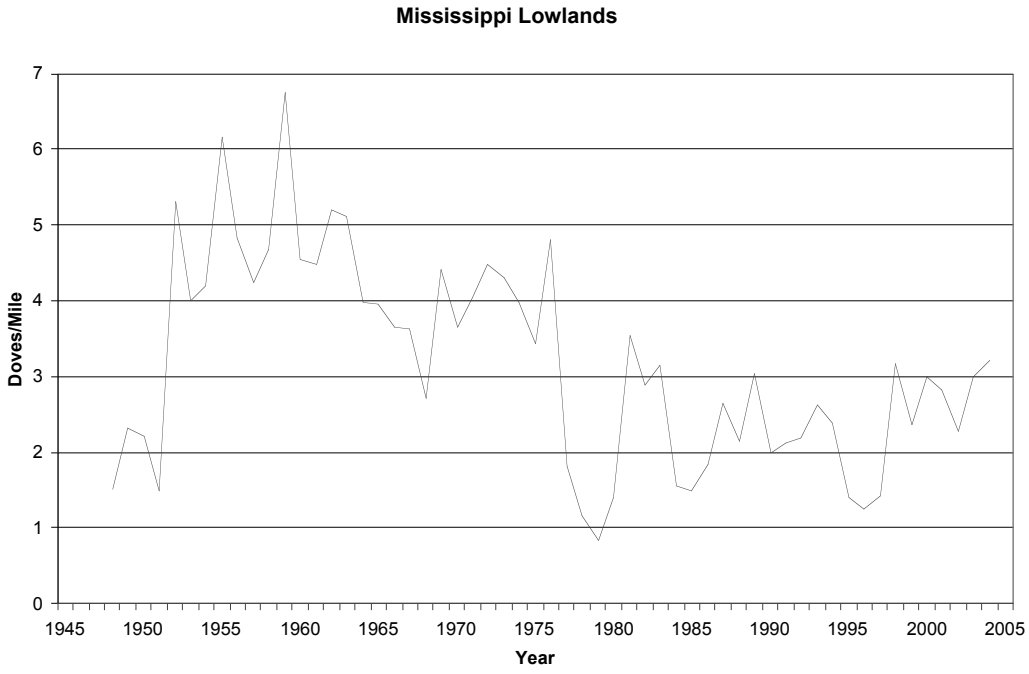

Figure 14. Mississippi Lowlands long-term trends.

Figure 15. Mourning dove management units (Eastern, Central, and Western) divided into subunits based upon reanalysis of historical banding data; states within subunits that are participating in the national pilot banding study are marked with X.

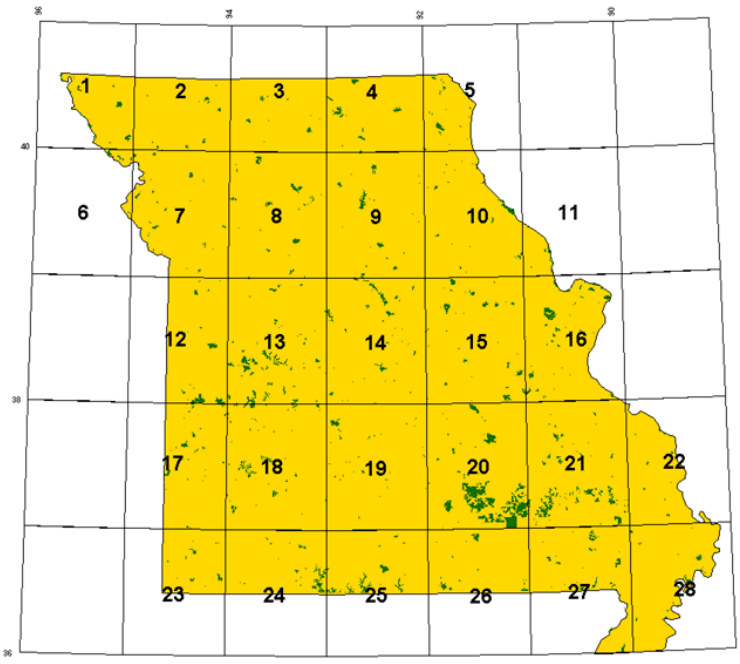

Figure 16. Map of latitude/longitude degree block used to assigned trapping/banding stations for the national mourning dove pilot banding study; dark areas represent Missouri Department of Conservation public lands.